

H. S. BAKER.
CIRCUIT MAKING AND BREAKING DEVICE.
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933,012.

Patented Aug. 31, 1909

Fig.

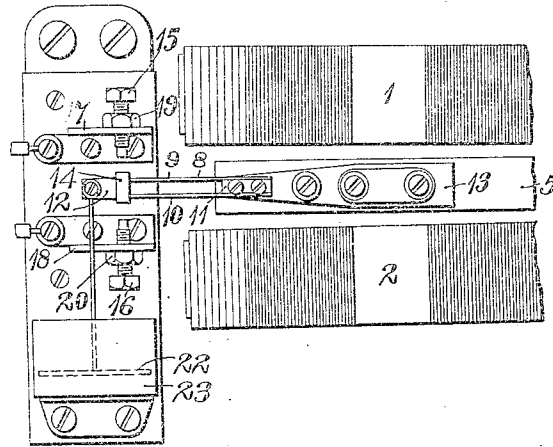
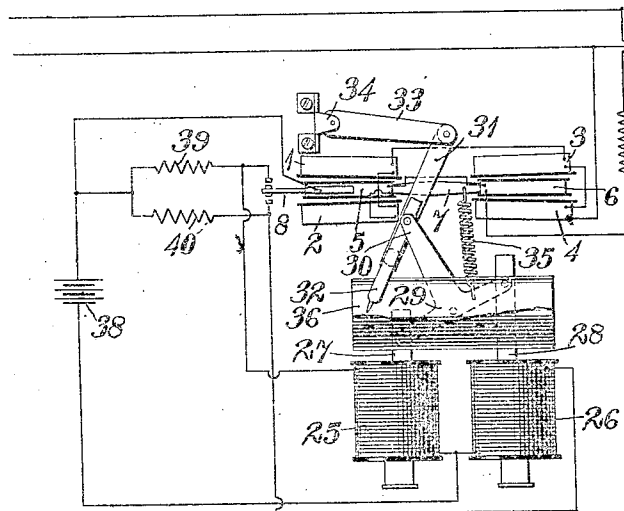


Fig. 2.



WITNESSES:

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HENRY S. BAKER, OF WILKINSBURG, PENNSYLVANIA.

CIRCUIT MAKING AND BREAKING DEVICE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HENRY S. BAKER, a subject of the King of Great Britain, and a resident of Wilksburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Circuit Making and Breaking Devices, of which the following is a specification.

My invention relates to electrical circuit making and breaking devices and particularly to such as are employed in connection with apparatus that is especially adapted for operation by alternating current.

One object of my invention is to provide such a structure and arrangement of the parts of a device of the character indicated that vibration between the circuit making and breaking members when in engagement, which might be caused by alternations of the current supplied to the apparatus in connection with which it is employed, may be substantially obviated.

A further object of my invention is to prevent, or to render of no material consequence, the sparking that usually occurs between circuit making and breaking members.

Figure 1 of the accompanying drawing is a view in front elevation of a portion of an apparatus that embodies my invention and Fig. 2 is a diagrammatic view illustrating one application of my invention and the circuit connections thereof.

Although my invention is not limited to use in any particular apparatus or specific relation, it may be conveniently applied to an instrument for recording electrical energy, current or voltage that comprises a plurality of stationary coils 1, 2, 3 and 4 arranged in pairs and two other coils 5 and 6 carried at the extremities of a frame 7 and movable between the opposing faces of the aforesaid coils. Carried by the movable member, is a flexible switch arm 8 comprising substantially parallel straps 9 and 10, the ends of which are soldered or otherwise secured to spacing pieces 11 and 12, the former of which is secured to a terminal plate 13 that is attached to the edge of the movable coil 5. Secured to the piece 12 near the free end of the switch arm 8 is a contact piece 14 that is preferably composed of silver and is adapted to engage the tip of the one or the other of screws 15 and 16 that are threaded in stationary posts or brackets 17 and 18. The screws are preferably provided

with platinum tips and they are adapted to be retained in position, when once adjusted, by means of lock nuts 19 and 20. The engaging contact terminals are composed, respectively, of silver and platinum, as described, because, when these metals are employed, or when other dissimilar metals having substantially the same properties are employed, it has been found that sticking and welding together of the parts, which might otherwise result from the sparking that usually occurs between the circuit breaking parts when an inductive circuit is interrupted, will be substantially prevented.

If the instrument to which the invention has been applied is operated by alternating current, the movable member will be subjected to a certain amount of vibration which it is desirable should not be transmitted to the engaging parts of the circuit making and breaking device, and for that reason, I have made the switch arm 8 flexible and have provided means for retarding the movements of its free end. The means here employed comprises a plate or piston 22 that is attached to the spacing piece 12 and is adapted to operate in a receptacle or cylinder 23 containing oil or another suitable liquid. Thus, when the contact piece 14 engages the tip of the one or the other of the screws 15 and 16 substantially no vibration will occur between these parts, because of the retarding effect of the dash pot device. The instrument to which the invention has here been applied comprises further, a pair of solenoids 25 and 26, terminals of which are connected respectively to the stationary posts 15 and 16, magnetizable cores 27 and 28 for the solenoids that are carried respectively at the extremities of the rocking beam 29 having an upwardly extending arm 30, a lever 31 that carries a fountain pen 32 or other suitable marking device at its lower end and is pivoted at an intermediate point to the extremity of the arm 30, a link 33, one end of which is pivoted to the upper end of the lever 31 and the other end of which is pivoted at 34, a helical tension spring 35 the ends of which are connected respectively to the frame 7 that carries the movable coils 5 and 6 and to the rocking beam 29, and a movable record strip 36 that is engaged by the fountain pen 32. One terminal of each of the magnet windings 25 and 26 is connected to one terminal of a battery 38, or they may be connected to one terminal of any

other suitable source, the other terminal of which is connected to the plate 13 carried by the coil 5.

When the parts of the instrument occupy the positions shown, if a torque is exerted between the stationary and movable coils, contact piece 14 will be moved into engagement with the screw 16 and the circuit of magnet winding 26 will be established. The core 28 will then be moved downwardly until the tension exerted upon the spring 35 balances the torque exerted between the stationary and movable coils, whereupon the contact piece 14 will be disengaged from the screw 16. The pen 32 will be moved across the movable strip 36 and a graphic record of the force exerted between the coils will be made thereby. If the torque exerted between the stationary and movable coils decreases, the contact piece 14 will be moved into engagement with the screw 15 by means of the spring 35 and the circuit of the magnet winding 25 will be established. The magnet core 27 will then be drawn downwardly until the tension exerted upon the spring 35 is reduced to correspond to the torque exerted between the stationary and the movable coil, whereupon the circuit of the magnet winding 25 will be interrupted.

In order to prevent, or at least render of no material consequence, the sparking caused by inductive discharges when the circuits of the magnet windings 25 and 26 are interrupted, high ohmic resistances 39 and 40 may be arranged in shunt circuit to the circuit making and breaking parts as shown in Fig. 2.

Since the structural details and arrangements of the parts may be considerably varied from what I have shown and described without altering to a substantial degree the mode of operation of the invention, I desire that all such modifications shall be included within its scope.

I claim as my invention:

1. A circuit making and breaking device comprising a stationary contact terminal, a flexible switch member to engage therewith and means acting directly upon the contact

end of the flexible switch member to retard its movements.

2. A circuit making and breaking device comprising a stationary contact terminal, a flexible switch arm to engage therewith, and a retarding device attached to the free end of the switch arm.

3. A circuit making and breaking device comprising a stationary contact terminal, an elastic movable arm having a contact piece at one end, and means acting directly upon the contact-bearing end of said arm for retarding its movements.

4. A circuit making and breaking device comprising a stationary contact terminal, an elastic movable arm having a contact piece at one end and a retarding device attached to the contact-bearing end of said arm.

5. In a circuit making and breaking device, the combination with a stationary contact terminal, and a switch member comprising spacing blocks and a pair of resilient strips secured thereto, of a retarding device attached to one end of the switch member.

6. The combination with an electrical circuit and a circuit making and breaking device arranged therein, comprising stationary contact terminals, a flexible switch arm having a contact member to engage therewith and means for retarding the movements of said contact member, of a resistance arranged in shunt relation to the circuit interrupting device.

7. The combination with an electrical circuit and a circuit making and breaking device arranged therein, comprising stationary contact terminals, a flexible switch arm having a contact member to engage therewith and means for retarding the movements of the contact member, of a resistance for absorbing inductive discharges in the circuit.

In testimony whereof, I have hereunto subscribed my name this 22nd day of March, 1906.

HENRY S. BAKER.

Witnesses:

WESLEY G. CARR,
OTTO S. SCHAIRER.